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# Exploring Failures at the Team Level in Offshore-Outsourced Software Development Projects

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**Abstract.** Offshore-outsourced software development (OOSD) projects involve multifaceted risks throughout the project execution, as they are handed over to third-party organizations and thus are exposed to more risks than in domestic outsourcing or captive offshoring. We concentrate on failed OOSD projects in this paper and analyze the unique aspects of such projects at the team level that lead to failures. Using the grounded theory approach, we conducted semi-structured interviews with 19 project managers involved in OOSD project failures from the vendor and client sides, who are based in India or Switzerland. We developed a set of propositions regarding multiple teams in the OOSD project context to explain failures. Integration of inter-organizational offshore and onshore teams from the vendor and client sides was found to be indispensable in avoiding project failures. Six categories of unique aspects that lead to OOSD project failures were identified and discussed in this exploratory work.

**Keywords:** Offshoring, outsourcing, software project, failure, project team.

## 1 Introduction

IT offshoring continues to experience significant growth levels despite the downturn in the global economy, and the global distribution of knowledge work is expected to increase further in the near future [1]. Although the proposition of sourcing software development services from low-cost countries like India and China remains compelling primarily because of cost factors, the multifaceted and inherent risks involved in third-party collaborations need to be managed effectively [2]. These global third-party outsourcing arrangements, or offshore outsourcing, involve particular challenges because the governance and organizational structures and project management styles of project partners could differ widely and thus affect the project execution. Offshore outsourcing involves more risks than captive offshoring, where the offshore organization together with the onshore organization mostly share the same processes and platforms that allow better collaboration than in offshore outsourcing.

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The challenges involved in offshore-outsourced software development (OOSD) were discussed extensively in the literature [3]. OOSD projects, with their inherent risks, are more prone to failures than captive offshore or domestic development projects [4]. The offshore-specific factors such as culture, language, knowledge transfer issues, and geographical separation make team management challenging [5, 6]. Several communication, coordination, and collaboration mechanisms need to be in place so that the vendor and client team members in OOSD projects can interact effectively [7].

A review of IT outsourcing literature reveals that most research focuses on the IT outsourcing decision processes and the management of IT outsourcing operations on engagement level rather than on operational level [3]. Several academic and practitioner studies have reported on failed offshore projects [e.g., 8, 9]. Research has revealed several aspects that contribute to the lack of success in offshore-outsourced projects. However, little focused research has been carried out on IT offshore project failures and failed software development projects. Further, the aspects that lead to failures were not studied extensively, and the extent to which the team-level interaction or the lack of its intensity that contributes to failure is not well understood.

The complexity of the nature of software development makes it vulnerable to failure, especially in offshore outsourcing [6, 10]. The definition of project failure varies widely in the IS research. Projects can be judged from the implementation and operations perspective [e.g., 11, 12] as well as from the project development perspective [e.g., 13, 14]. As we focus on software development processes in offshore projects that could not be completed in this research, we will adopt the project development perspective. We define *project failure* as the cancellation of the OOSD project, resulting in premature termination of contractual activities between clients and vendors before the information system becomes operational. This could include the insourcing of the project because of the vendor's inability to implement the software, the vendor replacement, the cancellation of offshore activities, or simply the project cancellation at some point. As the project risks are multi-faceted, the cancellations can happen during any phase of the project.

Faraj and Sproull [15] define *team* as "a primary mechanism for accomplishing organizational work" for in-house development projects. OOSD project setup involves team members from vendors and clients working at onshore and offshore sites. Typically, three different teams will be involved in OOSD projects, namely, client, vendor onshore, and vendor offshore teams.[1] Instead of working as a single team unit like in in-house projects or to a great extent in captive offshoring, offshore-outsourced projects involve loosely coupled three-team units that work for a common objective. The vendor offshore and onshore teams will be mostly sub-units in the global organization, with dedicated "linking" points [16]. The IS outsourcing context involves boundary-spanning activities across organizations. In this work, we define

[1] Since client and vendor onshore team members mostly work at the onshore site, they will be together referred to as "onshore teams" in this paper. The vendor offshore team will be referred to as the "offshore team." OOSD projects can have client members distributed across the globe within the same organization.

*project team* as a group of project members from different organizations that work together to accomplish a common objective. In the IT outsourcing context, the organizational objective will be the development of the information system as contracted by the client and guided by the client's organizational objective. Onshore and offshore teams will have different task definitions, and the challenge in the offshore context will be to integrate different teams into a single project team. The interactions between offshore and onshore team members require leadership and organizational structures that allow team development, defined as well as undefined communication processes, and understanding of cultural values and norms etc. The organizational team setup at the vendor side, with its onshore and offshore teams, exacerbates the coordination activities in OOSD projects. The failure to work together as a project team has been an unexplored area in IT outsourcing. We investigate the unique project team aspects in OOSD projects and the team member (non-) interactions that lead to project failures in an exploratory manner. In this paper, we will attempt to answer the following research question:

*Which unique aspects of offshore-outsourced software development projects that are related to the project team lead to failures and how do they lead to failures?*

## 2 Research Methodology

We employed the grounded theory methodology in this exploratory research [17], as it offered the appropriate methodology to provide theoretical explanations about failed OOSD projects. The sensitivity of failures among both vendors and clients in the IT industry forced us to investigate failures from project managers' experiences. We conducted semi-structured interviews [18] with client and vendor project managers who are involved in projects from India and Switzerland. The semi-structured interview has an incomplete script and leaves room for improvising questions to obtain the rich details of OOSD projects. Our overall approach can be termed as "qualitative-exploratory" [19] and we used semi-structured interviews as a method to "obtain a rich, in-depth experiential account" of projects from the failed OOSD projects [20].

Based on our previous research [21, 22], we focused this research on the team level, as its relevance was found to be key to OOSD project success. We interviewed 19 offshore project managers (PM) until a theoretical saturation of categories, concepts, and properties was reached according to the grounded theory approach. These 19 managers (9 from the client and 10 from the vendor sides) each provided details of a major OOSD project failure in their careers. They were also asked to discuss the most successful OOSD project in their career, which is out of the scope of this paper. The interviewees with failure experiences were found through the major organizations involved in offshoring in Switzerland and India. We have further requested that interviewees suggest other candidates with similar failure experiences for interviews. Another 23 interviews could not be used for the analysis, as the PMs interviewed had a different version of the definition of failure and so their project cases did not qualify within our narrow failure definition. These invalid interview cases came under the categories of challenged projects [14] or near-shore projects

within the same continent [23]. Table 1 provides the overall career experiences of the interviewees from the client and vendor sides. The higher average experiences of client PMs in project and OOSD project management also explain the more average number of successes and failures witnessed by client PMs than vendor PMs.

**Table 1.** Overall career experiences of project managers

| | **Clients** | **Vendors** |
|---|---|---|
| No. of interviewed project managers | 9 | 10 |
| IT-related (average years) | 16.56 | 15.22 |
| OOSD project (average years) | 8.33 | 9.56 |
| Project management (average years) | 11.11 | 8.56 |
| OOSD project management (average years) | 7.22 | 6.11 |
| Average no. of OOSD failures | 5.89 | 1.78 |
| Average no. of OOSD successes | 21.67 | 13.33 |

We employed grounded theory techniques for coding and analysis. Each interview lasted around 1 hour, and the transcribed texts had lengths of between 8 and 16 pages. We used MAXQDA 10 software for data coding and analysis. Open and axial codings [17] were employed to build thematic categories of data and to understand the relations between the emerging concepts. The concepts were further interpreted to provide theoretical explanations for OOSD project failures.

We aimed to develop a substantive theory to explain OOSD project failures [24] at the team level. The theoretical explanation was further developed using the generalizability framework of Lee and Baskerville [25] to derive propositions from empirical statements to theoretical statements from the qualitative data analysis.

## 3 Related Literature

We discuss the relevant literature related to the team-level performance in this section.

According to Carmel and Agarwal [26], physical distance between team members results in coordination, control, and communication problems. The main challenge they identified in global software development is the negative impact of distance on communication and its negative impact on coordination. Carmel and Abbott [7] studied the configurations of global software development in offshore and near-shore destinations and found out that "distance still matters"; they found out that the difficulties introduced by distance include communication, control and supervision, coordination, creating social bonds, and building trust.

Carmel and Tjia [27] maintained that five centrifugal forces affect offshore software development and thus the performance of team members. They include communication breakdown, coordination breakdown, control breakdown, cohesion barriers, and cultural clashes. Heeks et al. [28] argued that there exists geographical, cultural, and linguistic distances between the client and vendors, which affect the relationship. Culture, tacit knowledge, and informal information were found to be the major factors affecting outcomes.

Krishna et al. [29] investigated cross-cultural issues of outsourcers in North America, Western Europe, and Japan with Indian software providers. They concluded that cross-cultural software production as a troublesome process, and they recommended that because of the importance of cultural matches between countries, the choice of "culturally neutral" projects such as embedded software and middleware would reduce cross-cultural issues. Interestingly, the success of India and other countries in offshore software development is in application software, as opposed to the culturally neutral software recommended by Krishna et al. [29].

Cultural distance has been widely cited as one of the factors affecting the outcome of offshore software development projects. Leidner and Kayworth's [30] review of culture proposed a tripartite view of IT-culture conflict, in which IT values, group member values, and values embedded in an information system provide the key to conflicts. The beliefs, ideologies, norms, and values of project members from different countries vary and thus affect the outcomes of IS development projects [6]. The widely cited cultural dimensions of Hofstede [31] that are applied in the offshore projects include power distance, individualism, masculinity, and uncertainty avoidance. They explain the differences between personalities on a national level. Narayanaswamy and Henry [32] proposed the design of a control strategy that fits the cultural setting, which will increase the project performance in offshore software development. Geffen and Carmel [33] suggest that there is *the cost of cultural distance* (apart from transaction costs) that the clients have to overcome to outsource to a different country. Beck et al.'s [34] research on an Indo-German case study found the relevance of combining formal and informal project management measures with "cultural intelligence" about the vendors (Indians) to produce the expected outcome. A mutual cultural understanding among team members was found to be the key for effective results. Ebert and De Neve's [35] study of global software development projects in a multinational company showed the necessity to communicate and coordinate intensively in order to achieve project success in globally dispersed teams. They argue that even "a common syntactical language does not necessarily mean the same semantics and pragmatics" (p. 68) to illustrate the interpretations of symbols in different cultures.

Fabriek et al.'s [36] study analyzed successful and failed offshore outsourced and captive software development projects and found that informal communication between team members played a key role in successful projects. Improper planning was found to be the main reason for failed projects. Prikladnicki and Audy's [37] case studies of captive and outsourced offshore projects point to the communication problems between team members. Communication between team members affects the knowledge transfer because the distances affect complete and unambiguous knowledge transfer [36, 38].

Damian and Zowghi's [39] case analysis of captive software development in the US and Australia found that face-to-face communication improves informal

communication and thus trust between the team members. Oshri et al. [5] argue that face-to-face meetings improve social ties and offer better possibilities to coordinate the tasks between team members in globally distributed projects. Prifling et al. [40] report the introduction of more formal project management that led to project success after the deliverables in an Indo-German project failed to meet the initial expectations of the client. Once trust has been established the amount of formal project control could be reduced. The differences in language, culture, and personalities could affect trust building and thus the technical communication[2] in projects [41]. Kotlarsky and Oshri [42] emphasized the importance of social ties, especially rapport and trust among globally distributed team members, for successful collaboration; social interactions were found to have aided informal communication in projects.

McGrath's [43] time, interaction, and performance (TIP) theory of groups offered a framework to understand the problems of teams and provided explanations regarding teams within an organization. The TIP theory is widely cited in social science and has been used in IS research to study group changes over time [e.g., 44, 45]. Time, interaction, and performance are the three dimensions that are unique for group works or projects and can be well applied to analyze the outcomes in OOSD projects. This theory posits that group members engage in multiple, concurrent projects and any group action involves modes and functions that contribute to organizational and group development. The group modes do not follow a fixed sequence of phases, and the group members can follow different mode paths in concurrent projects. This is in contrast to Tuckman's [46] popular model that follows a sequence of activities in four phases, namely, forming, storming, norming, and performing. The four group modes of the TIP theory include [43]:

- Mode I: inception and acceptance of a project (goal choice);
- Mode II: solution of technical issues (means choice);
- Mode III: resolution of conflict, that is, of political issues (policy choice); and
- Mode IV: execution of the performance requirements of the project (goal attainment).

The team activities follow the default path from mode I (inception) to mode IV (execution) if the tasks are familiar and established. However, the OOSD project scenario brings several challenges that are unfamiliar for the team members, which result in a great amount being spent on modes II (problem solving) and III (conflict resolution).

Dennis et al.'s [47] theory of media synchronicity explains the communication processes in groups in terms of conveyance and convergence of information. Familiarity of the context requires less emphasis on the convergence of meaning between members and vice versa. Their use of the TIP theory explains the use of

[2] Sharma et al. (2008, p. 64) define technical communication as "communication activities that take place between a client and vendor based on the outsourcing contract managed by client as well as vendor project managers using different communication modes—from the exchange of information (explicit) to the sharing of nuanced intelligence (tacit)."

media and communication processes within a team. Jarvenpaa and Leidner's [48] study of communication and trust in global virtual teams showed the importance of communication behaviors and member actions resulting in "swift" trust, especially in the group's early formation stage. Unfamiliar situations will require team members to go through all four modes to establish trust in the team.

The literature review shows a lack of research that investigates failures in OOSD projects. Consequently, the works that provide a direct explanation of failures are missing. In order to explore the failures in detail, we analyze failed OOSD project cases to provide theoretical explanations of the specific aspects that lead to failures.

## 4 Discussion

Table 2 provides an overview of the failed OOSD project cases[3] that were analyzed from the interviews. It gives a summary of the countries involved in OOSD project, the industry where the project was executed, and the cancellation phase during the project. All projects involved India as an offshore destination, and different industries such as banking, air transport, power generation, public sector, insurance, and automotive were represented in the sample. All the projects were cancelled during the last 10 years.

**Table 2.** Failed project cases

| Interview cases | Countries involved | Industry | Cancellation phase |
|---|---|---|---|
| A | Germany, India, Switzerland | Power generation | Integration and testing |
| B | India, Switzerland | Banking | Integration and testing |
| C | India, Switzerland | Insurance | Integration and testing |
| D | India, Switzerland | Banking | Integration and testing |
| E | India, Switzerland | Banking | Integration and testing |
| F | India, Switzerland | Insurance | Requirement analysis |
| G | India, Switzerland | Banking | Integration and testing |
| H | India, Singapore, Switzerland | Banking | Integration and testing |
| I | India, Switzerland | Air transport | Integration and testing |
| J | Germany, India, Switzerland | Insurance | Integration and testing |
| K | India, Switzerland | Banking | Integration and testing |
| L | India, USA | Automotive | Integration and testing |
| M | India, Switzerland, USA | Insurance | Requirement analysis |
| N | Germany, India, Switzerland | Public sector | Integration and testing |
| O | Germany, India | Automotive | Integration and testing |
| P | India, Switzerland | Public sector | Integration and testing |
| Q | India, Switzerland | Insurance | Integration and testing |
| R | India, Switzerland | Air transport | Integration and testing |
| S | India, Canada, Switzerland | Insurance | Requirement analysis |

[3] We will use the terms "project cases" and "cases" interchangeably in this paper. This should not be mistaken for case studies.

Except for case Q, which was executed using agile methodology, the rest were executed using the waterfall model, which includes the following phases: requirement analysis, design, coding, and integration and testing. Most of the projects dragged on to the integration and testing phase, when the final decision to cancel the project was made. The cancellations happened earlier only in cases F, M, and S, when they occurred during the requirement analysis phase, where the difficulties in executing offshore projects were noted earlier.

We will discuss the unique or specific aspects related to the OOSD projects and team performance that led to failures in this section. The data analysis has resulted in six general categories of project aspects that explain the project failures. They include offshore-specific and non-offshore specific aspects. *Offshore-specific aspects* are unique to OOSD projects and require special attention. They include project team-building efforts, team collaboration, distant team judgment, and offshore project management capability. *Non-offshore specific aspects* are not unique to OOSD projects, but they require more attention than in domestic software outsourcing projects in order to offset the disadvantages caused by an offshore-specific environment. They are common project execution structures and team member competencies.

McGrath's TIP theory [43] has provided explanations of failures within an organization at onshore or offshore sites. However, it has a limited ability to explain the interactions between team members in multiple teams from at least two organizations and the offshore-specific factors that resulted in OOSD project failures. We have formulated theoretical propositions that are relevant for the OOSD project context, in which multiple teams from the outsourcer and outsourcing organizations come together to design and develop the information system.

### 4.1 Project Team-Building Efforts

Most failed projects suffered their fate because of the lack of a project team that worked together. The vendor and client teams did not work as an integrated project team. The onshore vendor PM of case P remarked the following about the team-building exercise and the barriers that led to failures: "You cannot ignore the status of team building. And if you start to ignore it, even if we have methods, even if we have processes, we are running a project. We are not doing business as usual. It's not something that has a clear input and a clear output. … And there I need to have a very high focus on team building. And as more of my team is distributed, the more I need to take care of our team building." There were few regular face-to-face interactions in failed projects, and so the teams lacked the social ties to openly discuss the project matters. The buildup of integrated teams with members from the client, vendor onshore, and vendor offshore teams was found to be a critical aspect that led to failures.

Face-to-face interactions of the team members who travel to onshore or offshore premises will add to the development of social ties [5] and eventually lead to better rapport and trust [42] among the team members. The team members should be clear about their roles and responsibilities from their inception in the project team, and the

PM should address the need and opportunities to interact with offshore and onshore team members right from the project inception [43]. Team member inception could happen at any phase during the project [43], so the PMs should make efforts to allow team-building across sites and thus make the new team members feel a part of the project team. Most offshore team members were found to be inducted into the project in the design or coding phase. Especially, the missing link in many failed cases was a lack of team affiliation of the offshore team members with the project team. This hindered the development of trust and rapport that could help to offset the cultural distances that exist between onshore and offshore teams. We found that story-telling is an effective tool to build relationship in offshore projects [49]. The efforts of offshore team members need to be appreciated in order to offer them recognition in the project team.

The TIP theory holds that all team members work together as an integrated team in the execution mode [43], a scenario that was missing in failed OOSD projects. The client, vendor onshore, and vendor offshore teams could form various sub-teams that have a low sense of team belongingness in the offshore project context. In order to emphasize the integrated nature of the offshore and onshore teams involved from vendors and clients, we formulate the following proposition.

**Proposition 1:** Project managers need to ensure that new team members are integrated into the project team comprising offshore and onshore teams from the client and vendor sides during all project phases in order to reduce the likelihood of project failure in the OOSD project.

### 4.2 Collaboration between Project Team Members

The project team members are not always aware of the communication barriers in OOSD projects and the need to adapt to the onshore-offshore project environment. Lack of awareness and adaptation of onshore as well as offshore team members to other cultures hinder the level of collaboration between vendor and client teams. The onshore vendor PM of case K remarked the following about the culture and collaborative work: “Collaboration is … something which is different for different cultures. So you have to adapt to the need of different cultures. For example, the Swiss are very, very people oriented. They would like to see the team. So organizing video conferences … being able to see the person by face, by organizing visits where the customer team goes to offshore to meet the project team, interacts with them, or even virtual parties.” The lack of cultural sensitivities or respect for the offshore team can lead to an exodus of offshore team members, as the onshore client PM of case L experienced because of his rigid and hard-hitting communication style. Indians were offended and demotivated by the open and rigid style of the US client manager, and most of the team members eventually left the company, leading to project cancellation.

The onshore vendor PM of case P noted that the increased interactions, especially face-to-face ones, made people feel a part of the project team: “When people travel here and then back, after a couple of months they were behaving as one team. But, as

I said, the people, it was not a bottleneck, the process was a bottleneck." Further, information needs to be conveyed and converged to ensure that the distant members also understand the same semantics and thus provide a basis for effective collaboration [47]. The onshore vendor PM of case Q remarked, "Any kind of language, either written or spoken, is subjective, not objective. And so you need to have a kind of feedback to get clear on what needs to be done, why it needs to be done, and whether something written in a requirement is a typo or has truly been meant that way."

Distributed project collaboration between onshore and offshore teams in offshore projects requires an awareness among the team members of how their presence and context relate to other members [50]. This awareness among teams improves the collaboration process, which involves "constructs such as coordination, communication, meaning, relationships, trust and structure" [42]. The social presence of team members on the other side will be perceived through a combination of formal and informal communication measures, which happen over time. The initial contact between onshore and offshore members could be over lean media such as e-mail and documents. The media could gradually become richer through the use of videoconferencing and chatting, which will allow the members to make sense of their own presence in the collaboration [38]. Eventually, occasional face-to-face meetings between team members from both the vendor and client sides help to establish the social presence of one team with the other teams. Team awareness could be viewed as a collective awareness of the social presence of one team in the offshore project context and what its context means to the other teams. We formulate the following proposition to capture the relevance of team awareness during the collaboration.

**Proposition 2:** Each team in the OOSD project needs to develop team awareness (collective awareness of the social presence of one team in the project team context and how its context relates to the other teams) in order to reduce the likelihood of project failure in the OOSD project.

The vendor PM of case N noted the situation depicted in figure 1 that led to project failure. The communication direction in the project was set up without involving the offshore team members. The vendor onshore team acted as a facilitator between the client and vendor offshore teams, and so the vendor offshore members only knew about the explicitly formulated information about the project, which was not rich in content. As the vendor offshore members were not aware of the social security systems in Europe, they were not able to provide the expected deliverables. Case I also had the same scenario, where no offshore team member was involved in direct communication with the client, which was the main reason for project failure; the offshore members did not understand the project requirements completely since the documented requirements were not explicit enough for the Indian developers to comprehend.

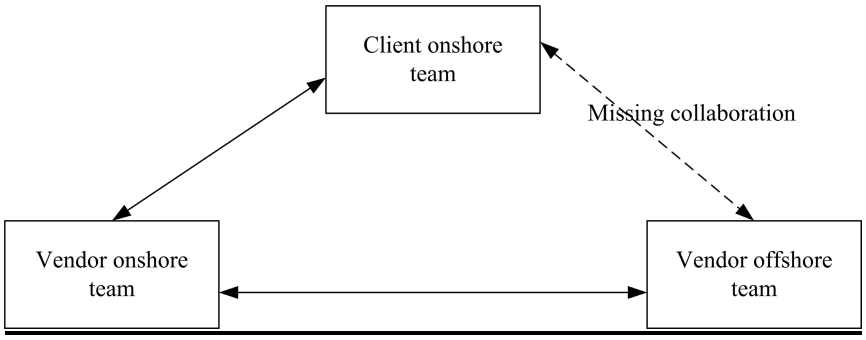


**Fig. 1.** Collaboration setup

Although software projects do not require direct contact with the customer [51], when the offshore team members are not familiar with the domain knowledge [52], the developers tend to make mistakes. Information intensity will be reduced with the intervention of facilitators located onshore, and so the vendor offshore members need to have a presence onshore to capture the missing bits and bytes relevant for the development. The collaboration level is affected by the cultural and physical distances between onshore and offshore teams that lead to information asymmetries between them [5]. Transactive memory stands for the set of knowledge possessed by the team members coupled with the awareness of who knows what information [53]. This memory system that could be established in the project team helps to find the required knowledge in the team. However, a lack of involvement from the vendor offshore team in the collaboration setup will result in the loss of tacit, embedded, and encultured knowledge required for the software development, which could prolong the project timeline and overshoot the budget [6]. The following proposition captures the nuances lost in OOSD project collaboration that leads to failures.

**Proposition 3:** The lack of direct vendor offshore and client onshore team collaboration will increase the likelihood of project failure in the OOSD project.

### 4.3 Distant Team Judgment

The physical distance between the offshore and onshore team members plays a key role in understanding the project team members. The client PM of case D remarked that since the team interactions were so rare that the offshore team's judgments could only be made by the quality of deliverables, "You're going to get a status report and as long as all the statuses were agreeing, you didn't have any interaction until the next day or whenever the next project review was. So they worked in isolation because they were offshore. We worked in isolation because we were onshore." The onshore vendor PM of case P noted the difficulties in judging the team and the progress in projects: "There is a barrier in communication. I cannot look into the eyes of the other one, I cannot hear the kind of volume and melody his voice is making or her voice is making. I cannot really ask questions." The PMs are not always in a position to offer

opportunities for team members to socialize in projects so that the teams can assess or judge what the other teams are currently working on.

The geographical distances between onshore and offshore teams that lead to separation despite the availability of information and communication technologies have been discussed extensively in the literature [23, 26, 27]. In offshore software projects, distance can exacerbate the difficulties in communication, control, coordination, and socializing [7]. If the difficulties of distance and culture can be overcome, the onshore and offshore teams can collaborate effectively, and the PMs will be in a position to judge the progress of team. This includes understanding whether some of the offshore manager's exaggerated assurances despite problems are meant for the future or provide the current status. Beck et al. [34] found that that the cultural intelligence of project managers could positively affect the project outcome. McGrath's TIP theory [43] offers an explanation regarding team synchronization over distances for in-house projects. The PMs in the OOSD project should be able to synchronize the project tasks and be able to judge the progress of the other teams, especially the vendor offshore team. We formulate the following proposition to underline the ability of PMs to judge the other teams.

**Proposition 4:** Project managers need to synchronize team tasks with other teams continuously in order to judge the progress of other teams and thus reduce the likelihood of project failure in the OOSD project.

### 4.4 Offshore Project Management Capability

The inability to manage offshore project as well as the project team will result in project failures. Project case M was cancelled in the requirement analysis phase, as the PM did not have the confidence to manage the offshore resources. The main reason for the failure in case B was the inability of the vendor coordinator at the onshore premise to communicate and manage the resources in the offshore location. Apparently, the coordinator was only acting as an extended official of the company in Switzerland and both arms of the same company operated without much organizational coordination. This offshore-onshore management gap happened both at the vendor and client sides.

The know-how to conduct offshore projects successfully by coordinating and controlling the resources forms the key to manage OOSD projects successfully [27]. The human resources need to be put in the right place to avoid management overhead and information asymmetries. The offshore-specific attributes such as distance, language, and culture [54] should be addressed to cause minimum friction for information flow. The PMs should have the ability to manage the distributed resources in an optimal manner. Although it cannot be expected that every team member has previous offshore project experience, the PM should have the experience of participating in at least one virtual or distributed global project, or he or she should be supported by a person with offshore project experience. Erickson and Ranganathan [55] reported that the project management capabilities that the client should master include project planning, control, governance, and team management. On the other

hand, Gopal et al. [56] noted project management techniques are required by the vendor to overcome the geographic distance with clients. In organizational setups where the vendor offshore team works as an extended arm of the vendor onsite team, it is important that both vendors and clients acquire the capability to manage their side as well as understand the organizational and cultural differences of the other side.

McGrath's TIP theory [43] explains that the project setup needs to consider the interaction possibilities and synchronization of tasks within a team. However, the ability of the PMs who manage the challenging role of integrating the project resources and efforts across the three teams is not explained satisfactorily. The understanding of cultural and organizational differences and sensitivities of the other teams by PMs play a great role in avoiding project failures. Both client and vendor teams should have project managers who possess the capability to manage the coordination and collaboration difficulties during the project execution. We formulate the following propositions that offer explanations of how to avoid management and coordination gaps between offshore and onshore teams.

**Proposition 5:** Project managers need to possess project management capabilities (project planning, control, governance, and team management in offshore projects) in order to reduce the likelihood of project failure in the OOSD project.

**Proposition 6:** Project managers need to consider the organizational and cultural differences of other teams during the execution in order to reduce the likelihood of project failure in the OOSD project.

### 4.5 Common Project Execution Structures

The lack of common understanding about project execution among team members results in projects not being completed according to agreed-upon budget and timelines. The geographical and cultural distances demand the need for mutually agreed project structures for successful execution. The vendor PM of case I expressed his disparate situation, saying, "If you can't describe it in a handbook, it ain't working." This has resulted because of misunderstandings in the available documentation, in which the cultural and domain-specific nuances could not be codified. Case F had to be cancelled in the requirement analysis phase as the project scope kept changing and the insecurity surrounding executing such a project offshore was high. The client PM of case M has mentioned that the scope change of internal projects was still possible, whereas with outsourcing arrangements, the changes proved very difficult.

According to the TIP theory, projects that have ill-defined processes will spend more time in problem-solving and conflict resolution modes [43]. The lack of co-located work possibilities requires the definition of project structures in an unambiguous manner. Project structures involved in OOSD projects have to be formulated from the beginning so that the projects can spend most of their time in the execution mode. They include scope formulation, requirement specifications, approvals, communication, documentation, tracking, and roles and responsibility

assignment etc., which require more formality in the absence of direct meeting possibilities. As the opportunities for face-to-face informal communication become rare for the project team, the additional formal structures that are shared by clients and vendors will offer fewer confrontation possibilities. Karahanna et al. [57] assert that work practices rather than individual values and beliefs will dominate during project execution. Mutually accepted structures and expectations about project management processes form the fundamental basis from which to execute offshore projects [8, 58]. We formulate the following proposition regarding the common project structures in OOSD projects, where the organizational and cultural differences cause various perceptions of project activities.

**Proposition 7:** A common understanding of project structures between onshore and offshore teams will reduce the likelihood of project failure in the OOSD project.

### 4.6 Team Member Competencies

Project team members should possess competencies varying from technical, communication, and domain knowledge in order to execute the project successfully. Although this expertise can result in staffing issues in domestic outsourcing projects, it has become more pronounced in the Indian context, where market forces play a big role in determining available human resources. Several vendors complained about the unavailability of the promised resources in the project, which led to disappointing situations. The vendor PM of case Q found that the competencies of the Indian developers were not adequate for the insurance domain, as they lacked the depth of industry experiences. The onshore vendor PM also noted the following about the competency of available resources in the failed case I: "I think the work we planned to outsource was just too complex and a lot of industry knowledge was required. We learned that it only works if you can describe it to the letter in a handbook."

Technical and domain-specific knowledge were identified in the literature as critical for offshore software project outcome [4, 59]. Balaji and Ahuja [60] have suggested the integration of external and internal knowledge within the team as critical for project success. The team member competencies have to be addressed during the inception of the project [43]. The PMs need to ensure that the team members also possess sufficient communication competencies to interact with other teams in the challenging offshore context. The project setup with the right resources is well explained by McGrath's TIP theory in the inception mode. This inception problem could be addressed for all teams involved from the project's start. However, the client PMs need to be more aware of the distance and the offshore team competencies, which cannot be controlled well by clients.

## 5 Conclusions

We have attempted to investigate the unique or specific aspects of offshore-outsourced software development (OOSD) projects related to the team level that lead

to failures, and explained them using a set of theoretical propositions. The grounded theory approach allowed us to analyze the empirical results together with the existing research in order to develop a theory of multiple teams to explain the OOSD project failures.

McGrath's time, interaction, and performance theory [43] offered explanations of failure within single teams in an organization. However, the multiple teams at offshore and onshore sites involved in OOSD projects from both vendor and client sides required explanations regarding inter-organizational project cooperation. We proposed a substantial theory of multiple teams to offer explanations of project failures in the OOSD project context. We offered the view that the onshore and offshore teams from the vendor and client sides should work as an integrated project team in order to avoid project failures. The six unique team aspects that pointed to project failures could explain project failures in OOSD projects to a great extent.

This research was limited to the project cases narrated by the PMs of failed projects in interviews. Although we have collected rich data regarding failures, they had more breadth than depth, as the cases were from a single viewpoint. However, we believe that this exploratory work has contributed to the IS offshoring and failure research, which is a rare field of investigation. Another limitation was the concentration of India-centric projects, which adds bias to the data. The research was also limited to software development projects that are done by third-party organizations in offshore countries.

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